

FutureGen

Coal-to-Hydrogen for Transportation



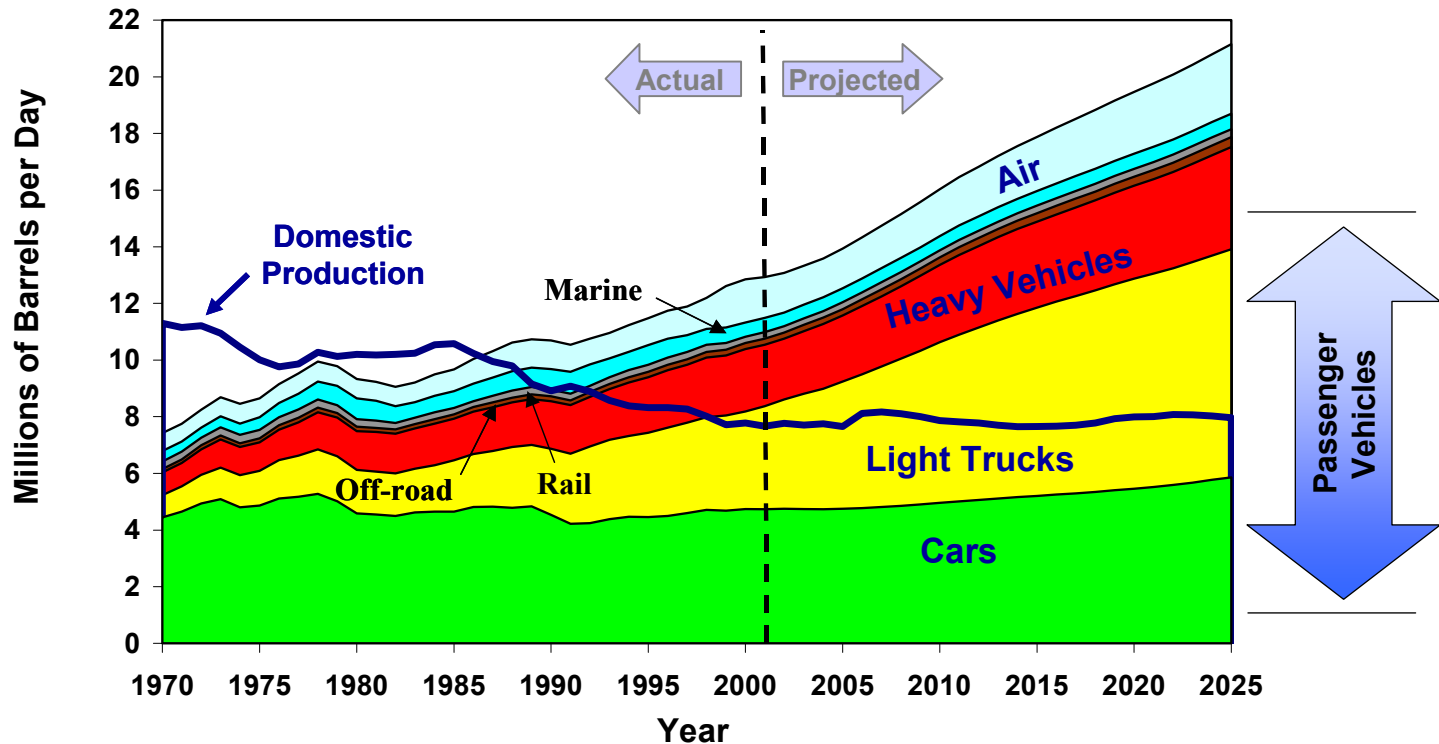
Presented at:
“Getting There from Here” –
Energy Panel

By:
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Technology Manager
University of Charleston
March 2, 2004

National Energy Technology Laboratory



U.S. Energy Dependence is Driven By Transportation



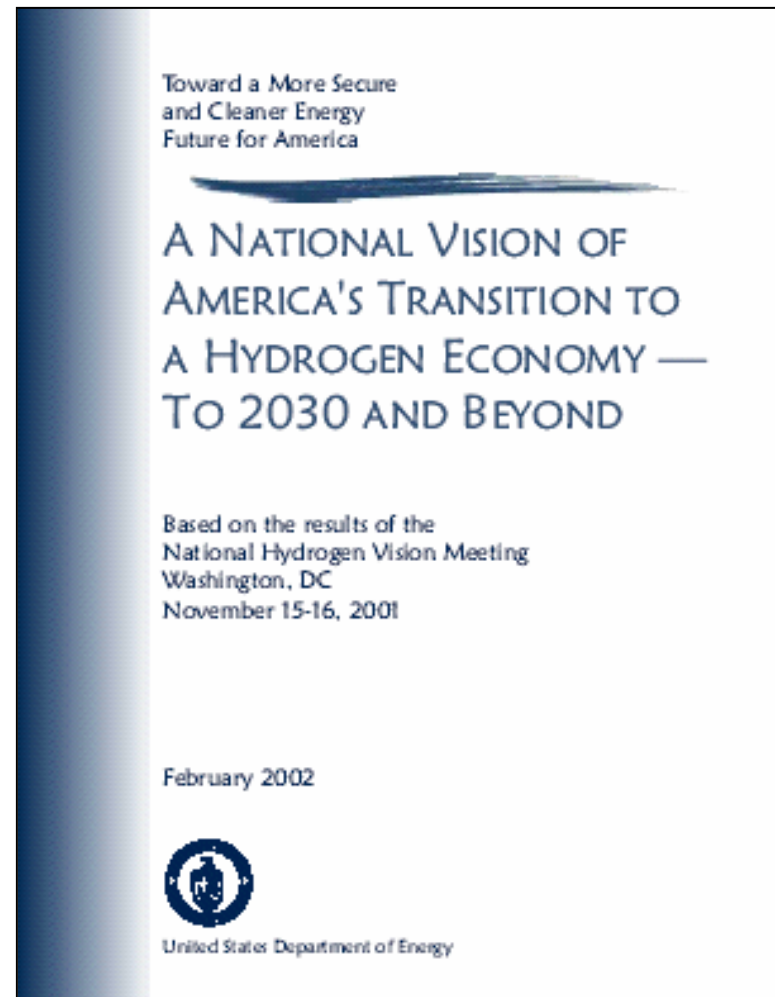
Source: Transportation Energy Data Book: Edition 22, September 2002,
and EIA Annual Energy Outlook 2003, January 2003

- Transportation accounts for 2/3 of the 20 million barrels of oil our nation uses each day.
- The U.S. imports 55% of its oil, expected to grow to 68% by 2025 under the status quo.
- Nearly all of our cars and trucks currently run on either gasoline or diesel fuel.

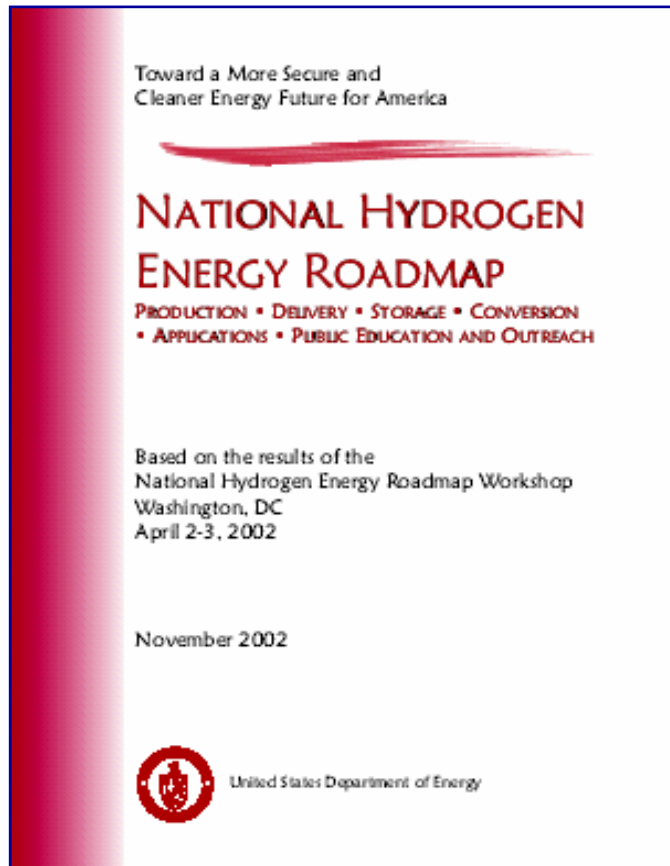
National Vision of the Hydrogen Economy

“Hydrogen is America’s clean energy choice.

Hydrogen is flexible, affordable, safe, domestically produced, used in all sectors of the economy, and in all regions of the country.”



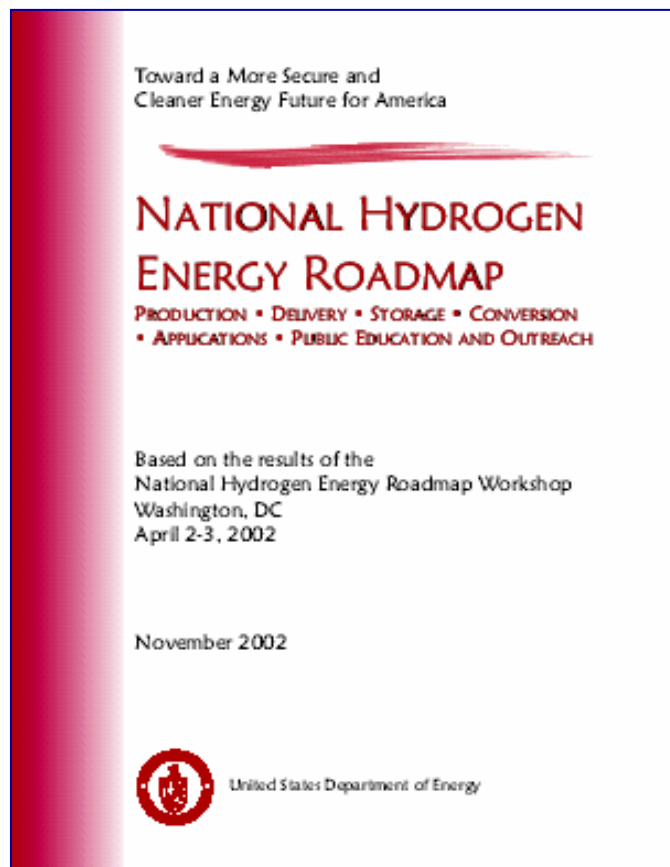
National Hydrogen Energy Roadmap



**“At the Department of
Energy we’re not just talking
about the hydrogen
economy, we’re working to
make it a reality. This
Roadmap provides a
framework that can make
the hydrogen economy a
reality.”**

**Energy Secretary Spencer
Abraham, November 12, 2002**

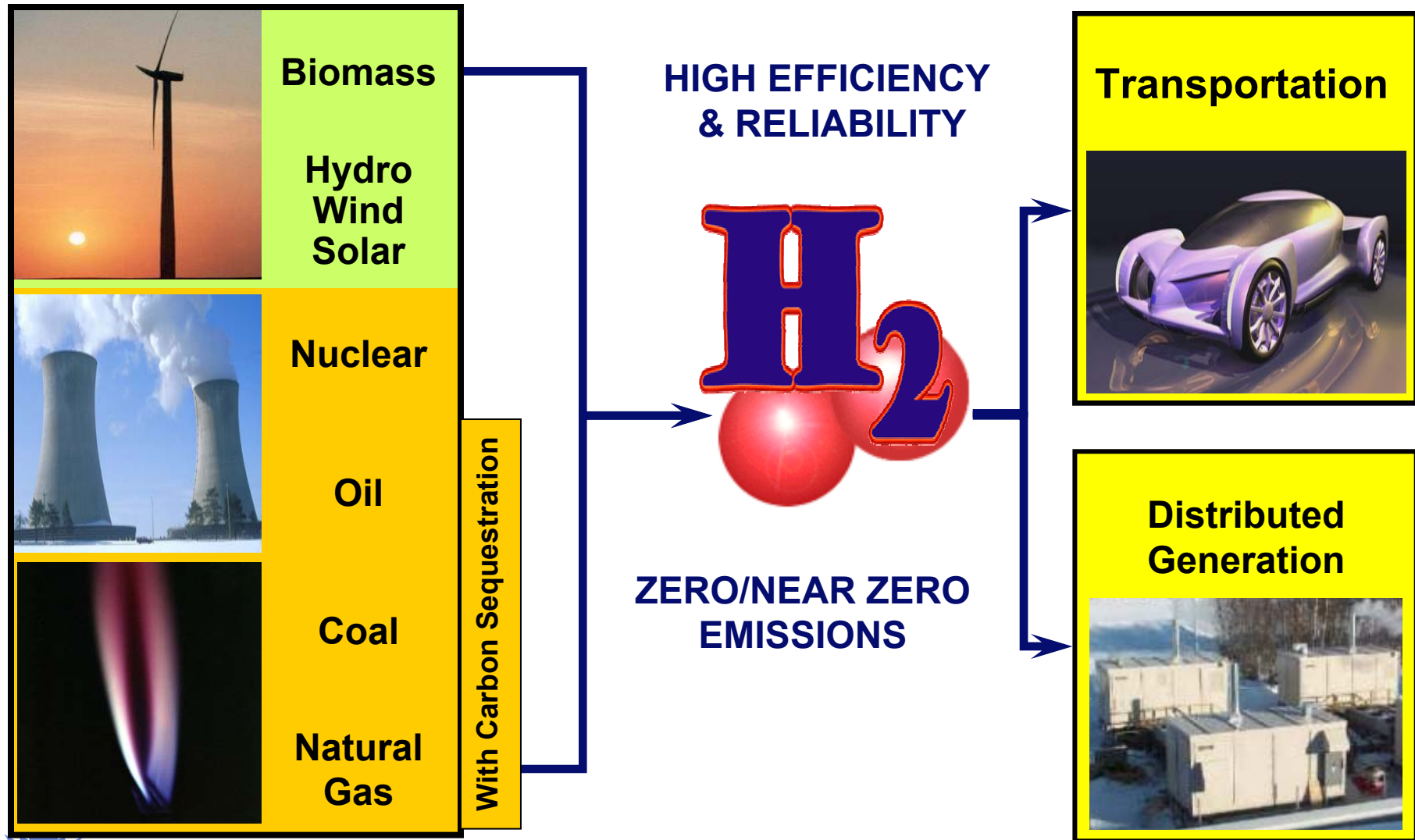
National Hydrogen Energy Roadmap



“In transportation applications, reformer research should be directed to enable near-term end use of hydrogen prior to the development of a nationwide hydrogen delivery system.”

**Short-Term Fuel: Gasoline & Diesel
Long-Term Fuel: Hydrogen
Pages 30 and 31**

Hydrogen Production/Hydrogen Use Options



President's Hydrogen Fuel Initiative Complements FreedomCAR

- Freedom from foreign petroleum dependence
- Freedom from pollutant and carbon dioxide emissions
- Freedom for Americans to drive where they want, when they want, in the vehicle of their choice
- Freedom to obtain fuel affordably and conveniently



On January 9, 2002, Energy Secretary Abraham announced the FreedomCAR Partnership



**FreedomCAR and Fuel
Initiative**



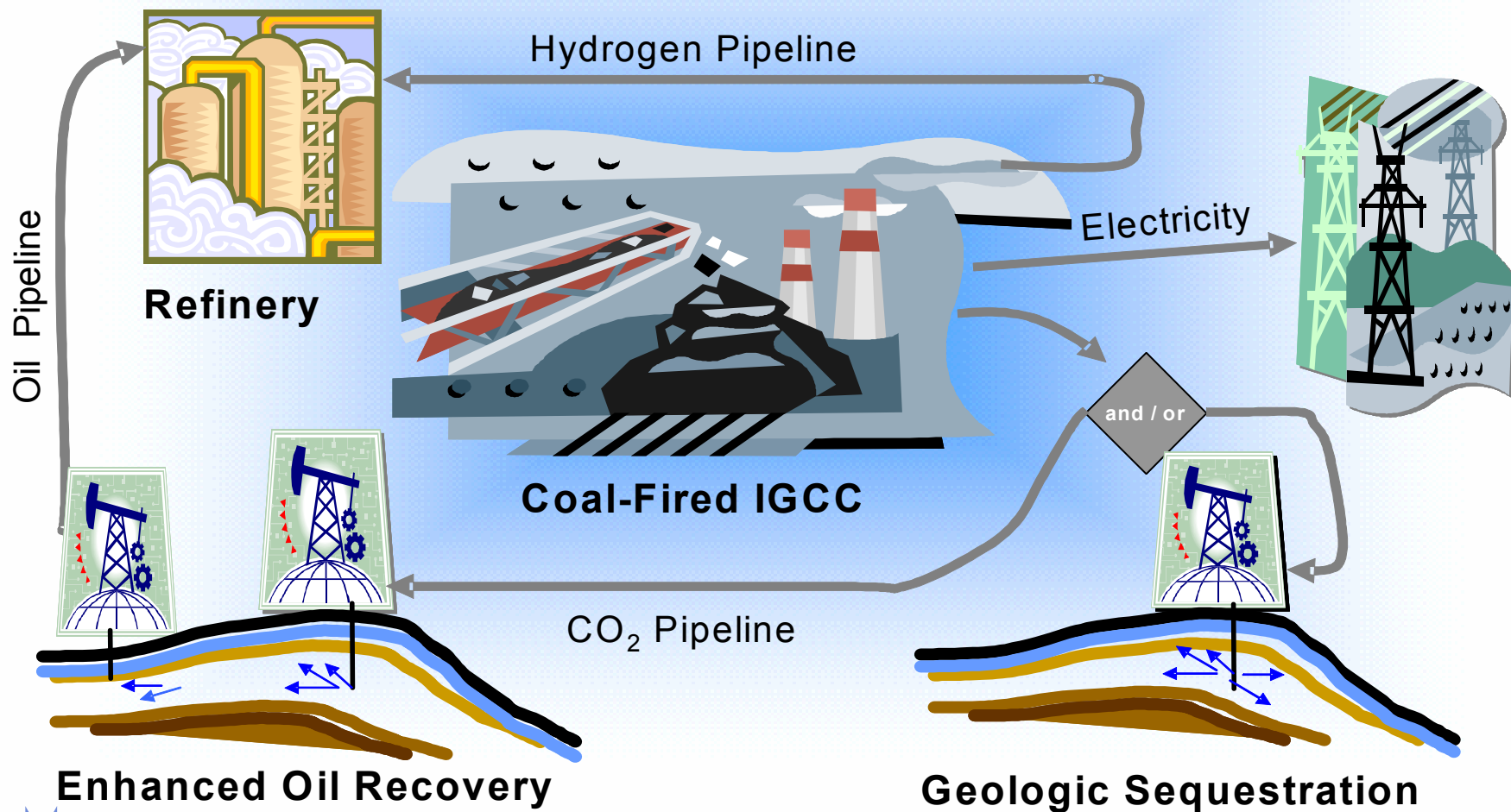
FutureGen: A Presidential Initiative

One-billion-dollar, 10-year demonstration project to create world's first coal-based, zero-emission electricity and hydrogen plant
President Bush, February 27, 2003

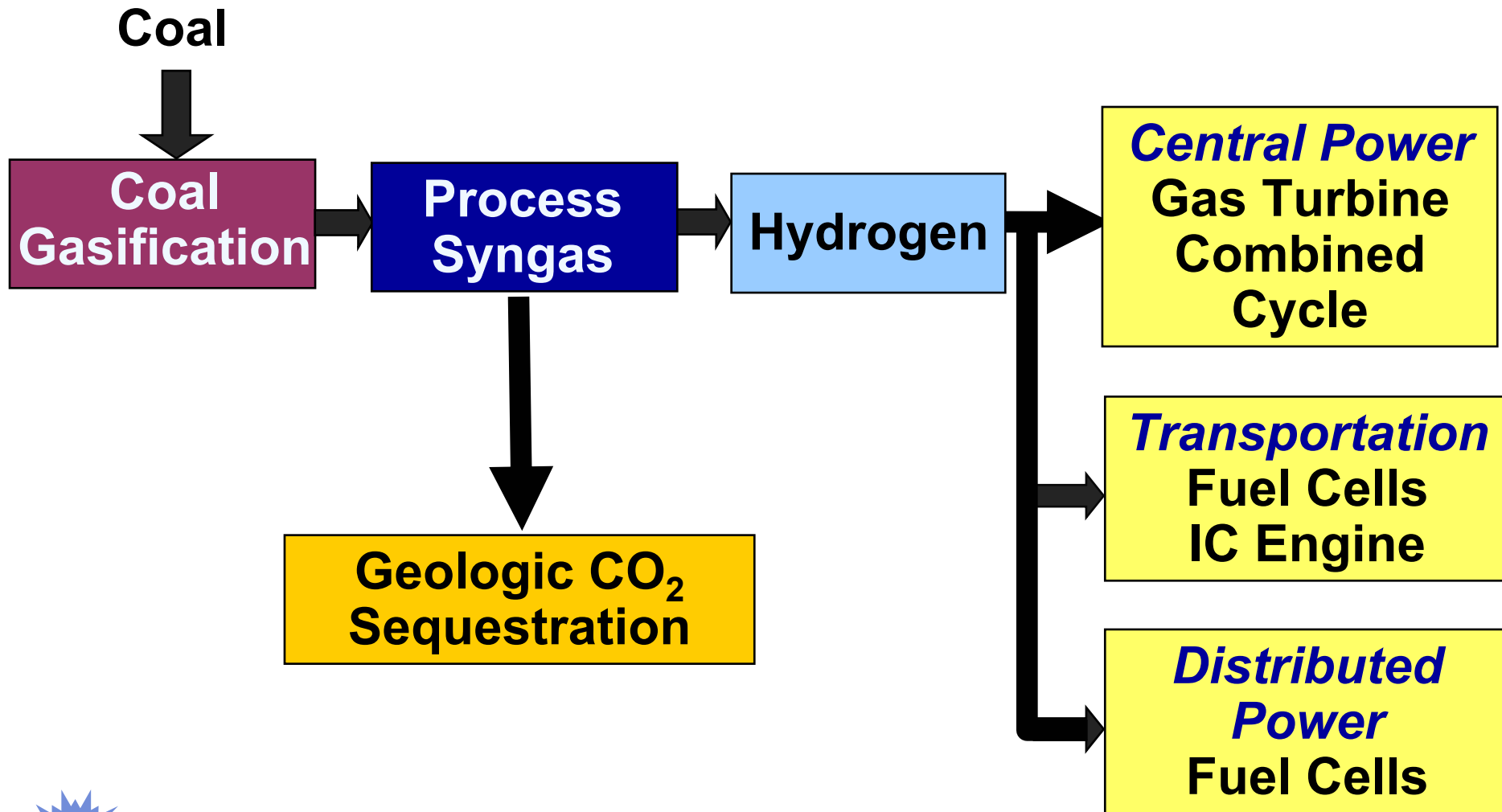
- Produce electricity and hydrogen from coal using advanced technology
- Emit virtually no air pollutants
- Capture and permanently sequester CO₂



FutureGen Concept

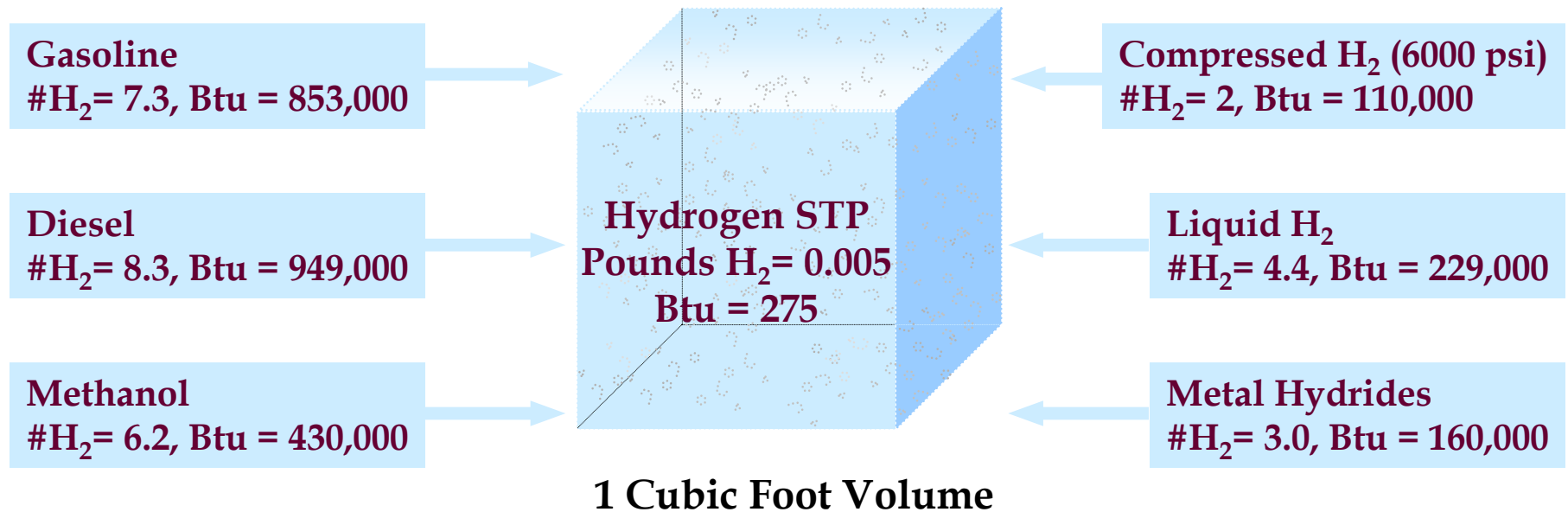


IGCC in FutureGen

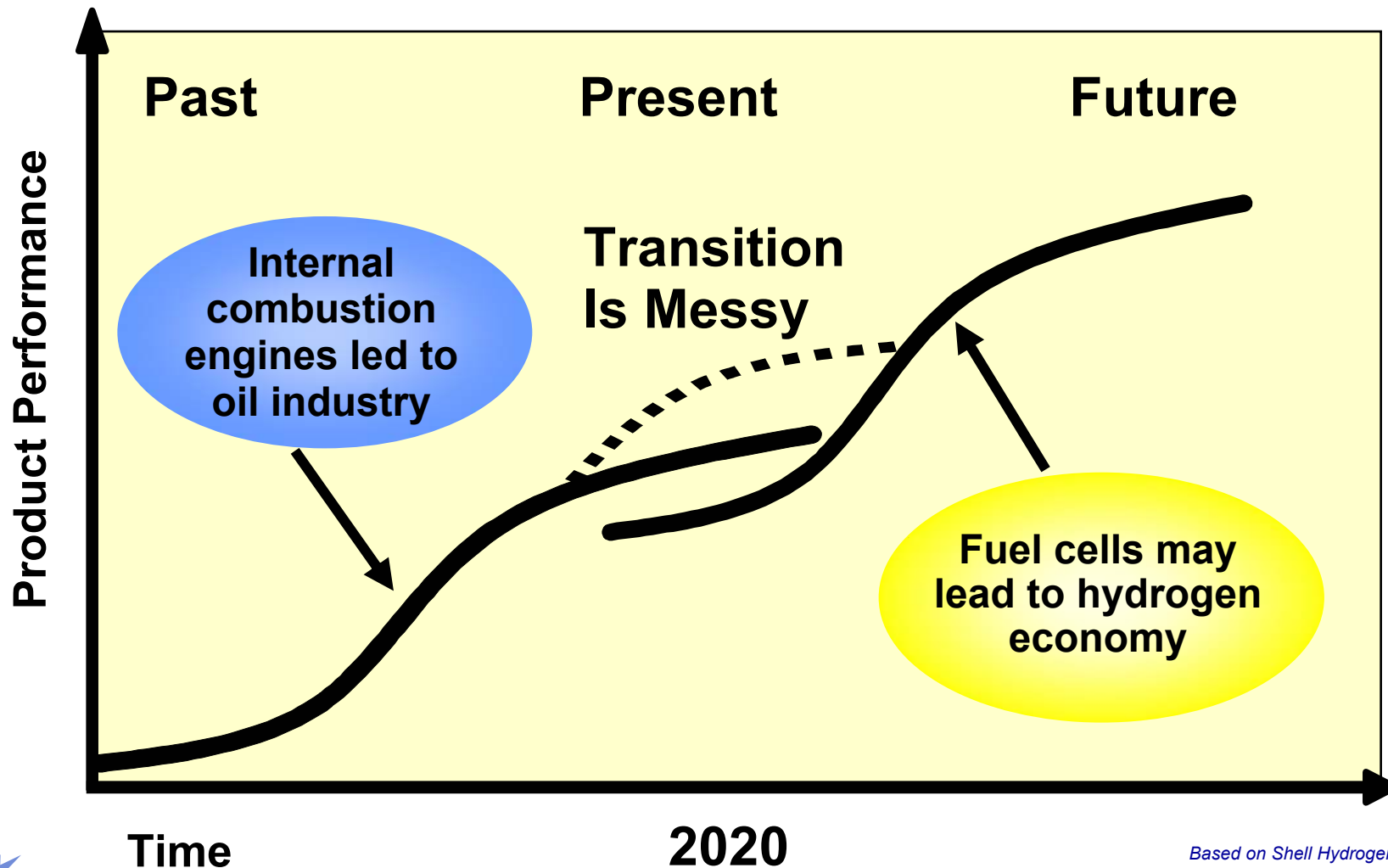


Hydrogen Storage

Safe Energy Density Issues



Transition to New Energy Economy Presents Challenges



West Virginia Participation/Benefits

- **Hydrogen economy is a long way off but...**
 - A national priority
- **High interest in research activities**
 - Universities participate in DOE R&D
 - WV companies participate in DOE R&D
- **Carbon sequestration-Regional Partnerships**
- **Large-scale research**
 - *FutureGen*
 - Deployment testing (clean fleets...clean cities)
- **Coal resource a national treasure**



Closing Comments

- **Coal must play a key role to secure a healthy economy**
 - Is recognized in Presidential-level initiatives; Climate Change, FutureGen, Hydrogen, Sequestration
 - Coal can play an important role in a potential future carbon-constrained world
- **Coal-based systems can lead to hydrogen economy but...**
- **Technical challenges are significant; secure and affordable energy future**
 - Research is key



For More Information...

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